

1 **CLAIMS**

2 We claim:

3
4 1. A method comprising:

5 parsing a search query to produce parsed concepts and keywords;

6 matching the parsed concepts and keywords to frequently asked questions;

7 conducting keyword searching on the keywords; and

8 returning results of the matching and the keyword searching.

9
10 2. A method as recited in claim 1, wherein the parsing comprises natural
11 language parsing.

12
13 3. A method as recited in claim 1, wherein the parsing comprises:
14 segmenting a search query into individual character strings;
15 producing a parse tree from parsable character strings of the search query;
16 and
17 outputting keywords based on non-parsable character strings of the search
18 query.

19
20 4. A method as recited in claim 1, wherein the matching and the
21 conducting are performed concurrently.

1 5. A method as recited in claim 1, further comprising identifying
2 answers associated with the frequently asked questions that match the parsed
3 concepts and keywords.

4
5 6. A method as recited in claim 1, further comprising presenting the
6 results in a user interface.

7
8 7. A method as recited in claim 1, further comprising logging the search
9 query and the results.

10
11 8. A method as recited in claim 1, further comprising:
12 logging the search query in a database, the database containing many search
13 queries; and
14 ascertaining frequently asked questions based on the search queries logged
15 in the database.

16
17 9. A method as recited in claim 1, further comprising:
18 identifying answers associated with the frequently asked questions that
19 match the parsed concepts and keywords; and
20 presenting the answers to a user for confirmation as to which answers
21 represent the user's intention in the search query.

22
23 10. A method as recited in claim 9, further comprising:
24 logging the search query and the answers confirmed by the user in a log
25 database; and

1 analyzing the log database to derive weighting factors indicating how
2 relevant the frequently asked questions are to the parsed concepts and keywords.

3
4 11. A method as recited in claim 9, further comprising:
5 logging the search query and the answers confirmed by the user in a log
6 database; and
7 analyzing the log database to derive weighting factors indicating how
8 relevant the answers are to the frequently asked questions.

9
10 12. A method as recited in claim 1, wherein the parsing is performed by
11 a natural language parser, and further comprising:
12 logging the search query in a database; and
13 training the natural language parser based on search queries logged in the
14 database.

15
16 13. A method as recited in claim 1, further comprising deriving a
17 confidence rating indicating how probable the results pertain to the search query.

18
19 14. A computer readable medium having computer-executable
20 instructions that, when executed on a processor, perform the method as recited in
21 claim 1.

22
23 15. A method comprising:
24 segmenting a query into individual character strings; and
25

1 processing the character strings to produce at least one of (1) a fully-parsed
2 output, (2) partially-parsed fragment, and (3) one or more keywords:
3

4 16. A method as recited in claim 15, wherein the segmenting comprises
5 forming a lattice of all possible character strings that may be segmented from the
6 query.
7

8 17. A method as recited in claim 15, wherein the segmenting comprises
9 forming a reduced set of all possible character strings that may be segmented from
10 the query.
11

12 18. A method as recited in claim 15, wherein the processing comprises
13 parsing the character strings using natural language parsing.
14

15 19. A method as recited in claim 15, further comprising matching the
16 fully-parsed output to a set of frequently asked questions.
17

18 20. A method as recited in claim 15, further comprising matching the
19 partially-parsed fragment to a set of frequently asked questions.
20

21 21. A method as recited in claim 15, further comprising conducting a
22 keyword search using the one or more keywords.
23
24
25

1 **22.** A computer readable medium having computer-executable
2 instructions that, when executed on a processor, perform the method as recited in
3 claim 15.

4
5 **23.** A method comprising:
6 parsing a query to produce at least one of (1) a fully-parsed output, (2)
7 partially-parsed fragment, and (3) one or more individual keywords;

8 in an event that a fully-parsed output or a partially-parsed fragment is
9 produced, matching the fully-parsed output or the partially-parsed fragment to
10 questions and identifying answers associated with the questions; and

11 in an event that the one or more keywords are produced, conducting a
12 keyword search on the one or more keywords.

13
14 **24.** A method as recited in claim 23, further comprising assigning
15 weighting factors to indicate how relevant the questions are to the fully-parsed
16 output or the partially-parsed fragment.

17
18 **25.** A method as recited in claim 23, further comprising assigning
19 weighting factors to indicate how relevant the answers are to the questions.

20
21 **26.** A method as recited in claim 23, further comprising presenting the
22 answers to a user for confirmation as to which of the answers represent the user's
23 intentions in the query.

1 27. A method as recited in claim 26, further comprising:
2 analyzing the query and the answers confirmed by the user; and
3 modifying the answers that are returned in response to the query based on
4 information gleaned from the analyzing.

5
6 28. A method as recited in claim 23, wherein the parsing is performed
7 by a natural language parser and further comprising evaluating the query, the
8 fully-parsed output and the partially-parsed fragment to train the natural language
9 parser.

10
11 29. A computer readable medium having computer-executable
12 instructions that, when executed on a processor, perform the method as recited in
13 claim 23.

14
15 30. A method comprising:
16 parsing a query to produce a partially-parsed fragment;
17 matching the partially-parsed fragment to one or more questions; and
18 identifying answers associated with the one or more questions.

19
20 31. A method as recited in claim 30, further comprising assigning a
21 weighting factor indicative of how likely each question pertains to the partially-
22 parsed fragment.

1 32. A method as recited in claim 30, further comprising assigning a
2 weighting factor indicative of how likely each answer corresponds to the one or
3 more questions.

4
5 33. A method as recited in claim 30, further comprising deriving a
6 confidence rating indicating how probable the answers pertain to the query.

7
8 34. A method as recited in claim 30, further comprising presenting the
9 answers to a user for confirmation as to which of the answers represent the user's
10 intentions in the query.

11
12 35. A method as recited in claim 34, further comprising:
13 analyzing the query and the answers confirmed by the user; and
14 modifying the answers that are returned in response to the query based on
15 information gleaned from the analyzing.

16
17 36. A computer readable medium having computer-executable
18 instructions that, when executed on a processor, perform the method as recited in
19 claim 30.

20
21 37. A method comprising:
22 receiving a query;
23 mapping the query to from a query space to a question space to identify
24 associated frequently asked questions;
25

1 mapping the questions from the question space to a template space to
2 identify associated templates;

3 mapping the templates from the template space to an answer space to
4 identify associated answers; and

5 returning the answers in response to the query.

6
7 **38.** A method as recited in claim 37, wherein the mapping from the
8 query space to the question space comprises:

9 parsing the query to identify at least one associated concept; and

10 correlating the concept to one or more frequently asked questions.

11
12 **39.** A method as recited in claim 37, wherein the mapping from the
13 question space to the template space comprises cross-indexing from a first table
14 containing question identifications to a second table containing templates
15 identifications.

16
17 **40.** A method as recited in claim 39, wherein the mapping from the
18 template space to the answer space comprises cross-indexing from the second
19 table to a third table containing answer identifications.

20
21 **41.** A method as recited in claim 37, further comprising:
22 presenting the answers to a user for confirmation as to which of the answers
23 represent the user's intentions in the query;
24 analyzing the query and the answers confirmed by the user; and
25

1 modifying the answers that are returned in response to the query based on
2 information gleaned from the analyzing.

3
4 **42.** A computer readable medium having computer-executable
5 instructions that, when executed on a processor, perform the method as recited in
6 claim 37.

7
8 **43.** A method comprising:
9 receiving a query;
10 returning multiple possible answers to the query;
11 receiving user confirmation of at least one of the possible answers; and
12 logging the query, the possible answers, and the user confirmation.

13
14 **44.** A method as recited in claim 43, wherein the returning comprises:
15 parsing the query to produce at least one parsed concept;
16 matching the parsed concept to one or more questions; and
17 identifying the possible answers as being associated with the one or more
18 questions.

19
20 **45.** A method as recited in claim 44, further comprising assigning a
21 weighting factor indicative of how likely each question pertains to the parsed
22 concept.

1 46. A method as recited in claim 44, further comprising assigning a
2 weighting factor indicative of how likely each answer corresponds to the one or
3 more questions.

4
5 47. A method as recited in claim 44, further comprising deriving a
6 confidence rating indicating how probable the possible answers pertain to the
7 query.

8
9 48. A method as recited in claim 43, further comprising:
10 analyzing the query, the possible answers, and the user confirmation; and
11 modifying the possible answers that are returned in response to the query
12 based on information gleaned from the analyzing.

13
14 49. A computer readable medium having computer-executable
15 instructions that, when executed on a processor, perform the method as recited in
16 claim 43.

17
18 50. A search engine comprising:
19 a parser to parse a query using natural language parsing and produce at least
20 one parsed concept or keyword;
21 a question matcher to match said at least one parsed concept or keyword to
22 at least one possible answer; and
23 a keyword searcher to search for other possible answers based on the
24 keyword.
25

1 **51.** A search engine as recited in claim 50, wherein the parser produces
2 at least one of (1) a fully-parsed output, (2) partially-parsed fragment, and (3) one
3 or more keywords.

4
5 **52.** A search engine as recited in claim 50, wherein the parser
6 comprises:

7 a segmentation module to segment the query into individual character
8 strings;

9 a natural language parser to parse certain character strings that are parsable
10 and leave the non-parsable character strings unparsed, the natural language parser
11 outputting a parse tree; and

12 a keyword searcher to identify keywords in the query and to output the
13 keywords.

14
15 **53.** A search engine as recited in claim 50, wherein the question matcher
16 comprises:

17 a database;

18 multiple tables stored in the database to hold information pertaining to
19 concepts, questions, and answers; and

20 a matching module configured to correlate, via the tables, the concepts with
21 the questions and the questions with answers.

1 54. A search engine as recited in claim 53, wherein the tables further
2 hold weighting factors that indicate how relevant the questions are to the concepts,
3 and how relevant the answers are to the questions.
4

5 55. A search engine as recited in claim 50, further comprising a user
6 interface to present the possible answers returned from the question matcher and
7 the keyword searcher.
8

9 56. A search engine as recited in claim 50, further comprising:
10 a user interface to present the possible answers returned from the question
11 matcher and the keyword searcher to a user for confirmation regarding which of
12 the answers represent the user's intentions in the query;

13 a query analyzer to evaluate the query, the possible answers, and the
14 answers confirmed by the user.
15

16 57. A search engine as recited in claim 50, further comprising a query
17 log to log the query and the possible answers.
18

19 58. A search engine as recited in claim 50, further comprising:
20 a query log to log the query and the possible answers; and
21 the parser being trained from data in the query log.
22

23 59. A search engine comprising:
24 a user interface to facilitate entry of a natural language query string;
25

1 a natural language parser to parse the query string and output at least one of
2 a fully-parsed output, partially-parsed fragment, and one or more individual
3 keywords.

4
5 60. A search engine as recited in claim 59, wherein the natural language
6 parser comprises:

7 a segmentation module to segment the query string into individual character
8 strings;

9 a natural language parser to parse certain character strings that are parsable
10 and leave the non-parsable character strings unparsed, the natural language parser
11 outputting a parse tree; and

12 a keyword searcher to identify keywords in the query and to output the
13 keywords.

14
15 61. A search engine as recited in claim 59, further comprising a question
16 matcher to match the fully-parsed output to a set of frequently asked questions.

17
18 62. A search engine as recited in claim 59, further comprising a question
19 matcher to match the partially-parsed fragment to a set of frequently asked
20 questions.

21
22 63. A search engine as recited in claim 59, further comprising a
23 keyword searcher to conduct a keyword search using the one or more keywords.

1 64. A parser for a search engine, comprising:
2 a segmentation module to segment a query into individual character strings;
3 a natural language parser to parse certain character strings that are parsable
4 and leaving the non-parsable character strings unparsed, the natural language
5 parser outputting a parse tree; and
6 a keyword searcher to identify keywords in the query and to output the
7 keywords.

8
9 65. A data structure stored on a computer readable medium, comprising:
10 a concept-question table to hold information pertaining to searchable
11 concepts and correlating the searchable concepts with associated search questions
12 that may be used to discover the searchable concepts;
13 a question table to hold information pertaining to the search questions and
14 correlating the search questions with associated answers that may be presented to a
15 user in response to a query;
16 at least one answer table to hold information pertaining to the answers; and
17 the concept-question table, the question table, and the answer table being
18 interrelated such that identification of a searchable concept leads to identification
19 of one or more answers corresponding to the searchable concept.

20
21 66. A data structure as recited in claim 65, wherein the concept-question
22 table also holds a weighting factor indicating how relevant each search question is
23 to the searchable concept.
24
25

1 67. A data structure as recited in claim 65, wherein the question table
2 also holds a weighting factor indicating how relevant each answer is to the search
3 question.

4
5 68. A computer-readable medium having computer-executable
6 instructions that, when executed, direct a computer to:

7 parse a search query using natural language parsing to produce parsed
8 concepts and fragments;

9 match the parsed concepts and fragments to frequently asked questions;

10 identify answers associated with the frequently ask questions; and

11 return results of the matching to a user for confirmation as to which of the
12 answers represent the user's intentions in the query.

13
14 69. A program as recited in claim 68, further comprising computer-
15 executable instructions that, when executed, direct a computer to:

16 identify keywords from the search query;

17 conduct keyword searching on the keywords; and

18 return results of the keyword matching.

19
20 70. A search engine, embodied on the computer-readable medium,
21 comprising the computer-executable instructions of claim 68.

22
23 71. An information retrieval program, embodied on the computer-
24 readable medium, comprising the computer-executable instructions of claim 68.